WHAT IS CLAIMED:

1.   In a mobile communications system where a mobile host communicates packet data with an external network by way of a packet gateway node, a method comprising:

5   the mobile host establishing a packet session during which plural application flows are communicated with an external network entity, each application flow having a corresponding stream of packets, and

defining a corresponding quality of service parameter for each of the plural application flows such that different quality of service

10   parameters may be defined for different ones of the application flows.

2.   The method in claim 1, further comprising:

delivering packets corresponding to each application flow from the external network entity to the mobile host in accordance with the defined corresponding quality of service.

15   3.   The method in claim 2, wherein the quality of service is defined for each application flow at a network packet layer for an end to end communication from the mobile host and the external network entity

4.   The method in claim 1, wherein different qualities of service have different allocated bandwidths, delays, or reliability.

20   5.   The method in claim 4, wherein the different quality of services include one class of service that is best effort where packets in an application flow may be dropped and another class of service that is predictive where packets in an application flow are not dropped.

6.   The method in claim 1, wherein a quality of service includes a delay class that specifies one or more of the following: a maximum packet transfer rate, a mean packet transfer rate, and a packet burst size of an application flow.

5   7.   The method in claim 1, further comprising:

storing subscription information for the mobile host specifying whether the mobile host may request a quality of service for specific application flows, and

checking the subscription information before defining quality of
10   service parameters.

8.   The method in claim 7, further comprising:

making available for the session each quality of service class to which a user of the mobile host subscribes.

9.   The method in claim 1, wherein session control messages are
15   communicated between the mobile host and the gateway node using a best efforts quality of service delay class.

10.   The method in claim 1, wherein establishing the packet session includes:

activating a packet session for the mobile host so that the mobile
20   host is in communication with the gateway node;

the mobile terminal requesting an end-to-end configuration between the mobile terminal and the external network entity.

11. The method in clam 10, wherein the end-to-end configuration request establishes a network packet layer bearer between the mobile host and the gateway node permitting relay of data packets between the external network entity and the mobile host even though a network packet layer address is not assigned to the mobile host.

12. The method in claim 11, wherein the gateway node functions as a dynamic host configuration agent serving the mobile host as a client relaying packets between the mobile host and the external network entity.

13. The method in claim 12, further comprising:
adding a remote agent identification corresponding to a mobile host identifier to messages intended for the external network entity.

14. The method in claim 13, wherein during configuration, the dynamic host configuration agent captures and stores a unique network packet layer address for the mobile host for the established session for each application flow activated during the established session.

15. The method in claim 14, further comprising:
establishing a data communications tunnel corresponding to the network layer bearer between the gateway node and the mobile host, and
establishing a relationship in the gateway node between a mobile host's identifier, the established tunnel, and the network packet layer address for the mobile host for the established session.

16. The method in claim 15, further comprising:

analyzing packets received at the gateway node and permitting only packets having a destination or source corresponding to one of the mobile host network layer addresses stored for the established session.

17. The method in claim 15, further comprising:

the gateway node routing packets according to a shortest path based on the network layer address for the mobile host for the established session.

18. In a mobile communications system where a mobile host communicates packet data with an external network by way of a packet gateway node and a packet serving node, a method comprising:

the mobile host establishing a packet session during which plural application flows are communicated with an external network entity, each application flow having a corresponding stream of packets;

making a reservation request from the mobile host to the gateway node for a particular quality of service for an individual application flow;

determining whether the reservation request can be met; and

if so, establishing a logical bearer between the mobile host and the gateway node that includes the serving node to bear plural ones of the individual application flows having different corresponding quality of service classes.

19. The method in claim 18, further comprising:

classifying and scheduling packets corresponding to each application flow from the external network to the mobile host over the bearer in

accordance with the defined quality of service class corresponding to the application packet stream.

20. The method in claim 18, further comprising:

the serving node determining if the reservation request for the particular quality of service is permitted by a subscription corresponding to the mobile host.

21. The method in claim 18, further comprising:

the serving node evaluating if the reservation request for the particular quality of service can be supported from the serving node to the mobile host based on a current traffic load of existing radio communications in the area where the mobile host is being served.

22. The method in claim 21, wherein the evaluating step includes the serving node estimating a delay and a bandwidth requirement corresponding to the requested quality of service.

23. The method in claim 22, further comprising:

the serving node providing the gateway node the estimated delay and an estimate of a bandwidth requirement corresponding to the reservation request, and

the gateway node providing the delay and bandwidth estimates to a network layer protocol.

24. The method in claim 18, further comprising:

the gateway node renewing the quality of service reservation.

25.   The method in claim 19, further comprising:

the gateway node monitoring each application flow to ensure that the reserved quality of service for that application flow is met.

26.   The method in claim 19, further comprising:

the gateway node scheduling transfer of packets corresponding to one of the application flows to ensure that the reserved quality of service for that application flow is met.

27.   The method in claim 19, further comprising:

the gateway node classifying packets using the reserved quality of service for the application flow to which each packet belongs.

28.   The method in claim 19, further comprising:

the serving node monitoring each of the application flows from the gateway node to determine whether a data transmission volume limit is exceeded, and

if so, the serving node discarding packets corresponding to an application flow having a lowest quality of service reserved.

29.   In a mobile communications system where mobile hosts communicate packet data with an external network by way of a packet gateway node and a packet serving node, a method comprising:

each mobile host establishing a packet session during which plural application flows are communicated with an external network entity, each application flow having a corresponding stream of packets;

defining a corresponding quality of service parameter for each of the plural application flows such that different quality of service parameters may be defined for different ones of the application flows; and

the serving node merging packets from different sessions with the

5   same quality of service.

30. The method in claim 29, further comprising:

the serving node merging packets destined for different mobile hosts within a same geographical service area and with the same quality of service.

10   31. The method in claim 29, wherein the merging is performed using first in first out scheduling except when packets cannot be delivered within a specified time.

32. The method in claim 29, further comprising:

the serving node assigning packets destined for a same geographical

15   service area but with different qualities of service to different priority queues corresponding to the different qualities of service,

wherein a larger number of packets are removed from a queue having a higher quality of service than a queue having a lower quality of service.

20   33. A mobile communications system, comprising:

a mobile terminal establishing a data packet communications session, running two data packet applications during the session, and communicating two data packet streams corresponding to the two data packet applications with another entity in an external network, and

a packet network connected between the mobile terminal and the external network entity reserving a different quality of service class for each of the two data packet streams associated with the mobile terminal during the session.

5   34.   The mobile communications system in claim 33, wherein packets corresponding to the two data packet streams having different quality of service classes are transferred to and from the mobile terminal using a data packet network bearer established for the session.

35.   The mobile communications system in claim 33, wherein the

10   quality of service class is reserved for each of the two data packet streams at a network packet layer for an end to end communication from the mobile terminal and the external network entity.

36.   The mobile communications system in claim 33, wherein different qualities of service classes have different allocated bandwidths,

15   delays, or reliability.

37.   The mobile communications system in claim 33, wherein one of the different quality of service classes is a best effort delivery class where packets in an application flow may be dropped and another class of service is a predictive delivery service where packets in an application flow

20   are not dropped.

38.   The mobile communications system in claim 33, wherein each quality of service class includes a delay class that specifies one or

more of the following: a maximum packet transfer rate, a mean packet transfer rate, and a packet burst size of an application flow.

39. The mobile communications system in claim 33, further comprising:

a database node that stores subscription information for the mobile terminal specifying whether the mobile terminal may request a quality of service for specific application data packet streams,

wherein the packet node checks the subscription information before a quality of service class is reserved.

40. The mobile communications system in claim 33, wherein the packet network includes:

a serving node connected between the gateway node and the mobile terminal;

a gateway node connected between the serving node and the external network entity.

41. The mobile communications system in claim 40, wherein the gateway node relays packets between the mobile terminal and the external network entity.

42. The mobile communications system in claim 40, wherein the serving node evaluates if a quality of service class reservation request can be supported from the serving node to the mobile terminal based on a current traffic load of existing radio communications in an area where the mobile terminal is being served.

43. The mobile communications system in claim 40, wherein the serving node estimates a delay and a bandwidth requirement corresponding to the requested quality of service.

44. The mobile communications system in claim 40, wherein the
5 gateway node periodically renews the quality of service reservation.

45. The mobile communications system in claim 40, wherein the gateway node schedules transfer of packets corresponding to one of the two data packet streams to ensure that the reserved quality of service for that is met.

10 46. The mobile communications system in claim 40, wherein the gateway node classifies packets using the reserved quality of service for the application flow to which each packet belongs.

47. The mobile communications system in claim 40, wherein the serving node includes:

15 a first set of queues storing packets having the same quality of service class and data packet communications session;

a second set of queues storing packet having the same quality of service class and the same mobile terminal; and

a third set of queues storing packets being served in the same
20 geographic area and having the same quality of service class.

48. In a mobile communications system including a packet network connected to an external network, a mobile terminal comprising:

a reservation controller reserving a different quality of service for different ones of plural data packet streams associated with corresponding applications operating at the mobile terminal and established during a data session when the mobile terminal is attached to the packet network, where

5   packets in the plural application flows are originated from the external network and are directed to the mobile terminal.